



# Technology Brief: Deep Learning



## Deep learning and its role in machine vision

Artificial intelligence, specifically machine learning by way of deep learning, is making machine vision technology for automated visual inspection more accessible and capable. Deep learning technology mimics how the human brain processes visual input but performs this task with the speed and robustness of a computerized system. The technology works to ensure quality in manufacturing industries, controlling production costs, and enhancing customer satisfaction.

Deep learning technology excels at certain applications, such as identification and defect detection, specifically in instances where there are complex and varying imaging conditions. The technology still benefits from conventional image processing and analysis to locate regions of interest within images to speed up the overall process and make it even more robust.



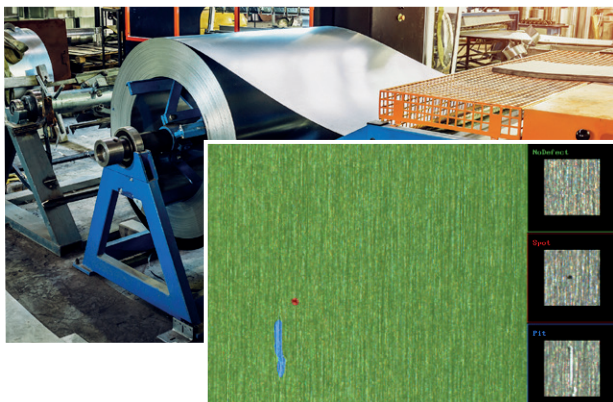
## Real-world examples

### Identification

Image classification using deep learning categorizes images or image regions to distinguish between similarly looking objects including those with subtle imperfections. Image classification can, for example, determine if the lips of glass bottles are safe or not.

### Defect detection

Image segmentation using deep learning categorizes image neighborhoods to pinpoint features like defects, such as dents and scratches on sheet metal. The located features can then be further analyzed and measured using traditional machine vision tools.



A leader in the machine vision industry, Matrox® Imaging leverages our vision expertise to apply deep learning technology when and where most appropriate and help our customers find the best solution for their applications.

Our team of specialist is here to help; contact us today!  
[www.matrox.com/imaging/deeplearning](http://www.matrox.com/imaging/deeplearning)  
[imaging.info@matrox.com](mailto:imaging.info@matrox.com)

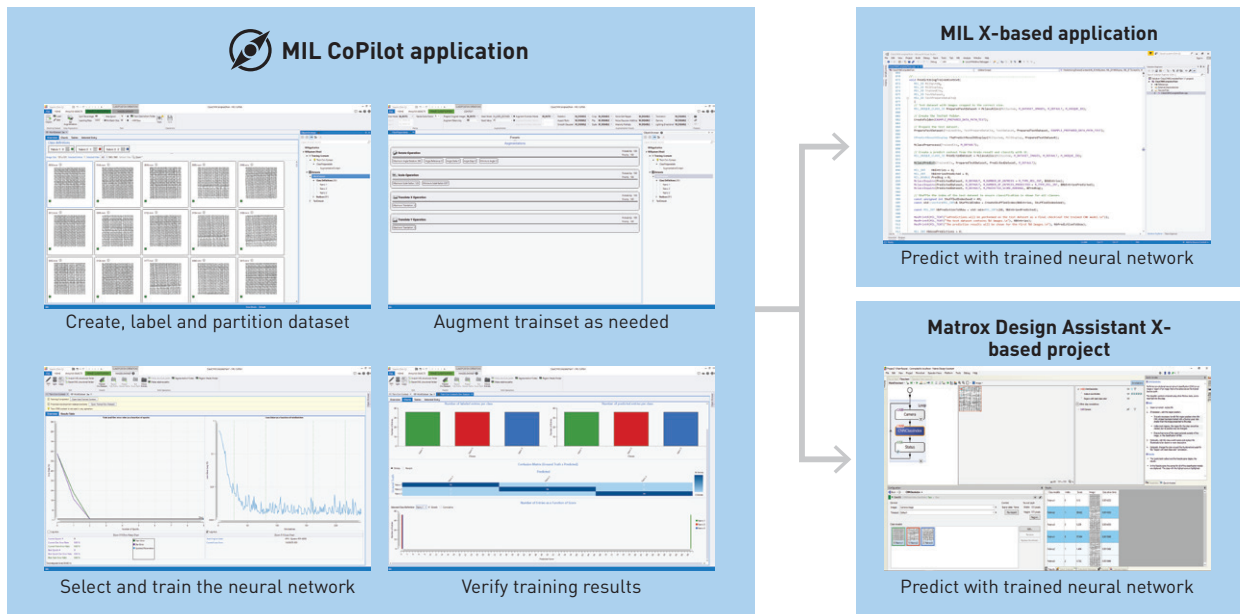


## Deep learning software and hardware

Matrox Imaging's software offerings—Matrox Imaging Library (MIL) X and Matrox Design Assistant® X—include vision tools to classify or segment images for inspection using deep learning. Both software packages deliver optimized convolutional neural networks (CNNs) or models for the task.

Key to deep learning is the training of a neural network model. MIL CoPilot's interactive environment provides the platform for training these models for use in machine vision applications. MIL CoPilot delivers all the functionality needed for this task, so you can create and label the training image dataset; augment the image dataset, if necessary; and train, analyze, and test the neural network model.

We also offer hardware products that facilitate deep learning training and deployment. A suitably equipped and configured model of the Matrox 4Sight XV6 industrial computer comes ready for deep learning training. Another Matrox 4Sight XV6 model as well as the Matrox 4Sight EV7 vision controller and Matrox Iris GTX smart cameras are available to run both traditional machine vision workloads as well as deep learning inference.



## Matrox Imaging's complete product lineup

For deep learning and machine vision development



Vision software



3D sensors



Smart cameras



Vision controllers



Frame grabbers

Matrox Imaging's team of vision experts know where and when to leverage machine and deep learning technologies to your best advantage. Our specialists can help identify your needs and find a customized vision solution for your requirements.

For more information [www.matrox.com/imaging/deeplearning](http://www.matrox.com/imaging/deeplearning)  
Contact [imaging.info@matrox.com](mailto:imaging.info@matrox.com)



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